

FEASIBILITY STUDY

**US 421
From Maple Springs to Wilkesboro
Wilkes County
R-2240**

**Prepared by
Planning and Research Branch
Division of Highways
N. C. Department of Transportation**

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General Description

This project is included in the 1987-1995 NCDOT Transportation Improvement Program for a feasibility study and/or right of way protection. The following report summarizes the findings of a preliminary study to determine appropriate improvements to the 11.6-mile segment of US 421 from east of Maple Springs to east of NC 268 near Wilkesboro. The entire project is located in Wilkes County (see attached figure).

Existing Facility

US 421 is classified as a Rural Principal Arterial in the North Carolina Functional Classification System. The westernmost 10.1-mile segment of the project between Maple Springs and SR 1322 was constructed in 1956-1957. The remainder of the project was constructed in 1967-1968 as part of the North Wilkesboro Bypass. No improvements other than resurfacing have been made since original construction was completed.

The segment between Maple Springs and SR 1322 consists of a two-lane, 24-foot pavement with 10-foot shoulders (4 feet paved). The easternmost 0.7-mile portion of this segment is currently being widened to a three-lane, 36-foot facility. The existing right of way (200 feet in width) is offset 115 feet south of the highway centerline and 85 feet north to accommodate future south-side widening to a four-lane divided facility with a 6-foot median. There is no access control along this segment, and all intersections are at-grade. A traffic signal exists at the NC 16 intersection; all other intersections are stop sign-controlled.

The segment between SR 1322 and NC 268 is a controlled access facility with a right of way varying in width from 260 to 320 feet. The westernmost 0.8-mile portion of this segment consists of a four-lane divided facility with 24-foot pavements, 12-foot shoulders (4 feet paved) and a 30-foot median. The remainder of this segment consists of a single 24-foot pavement and 12-foot shoulders (4 feet paved). The highway is offset within the right of way to allow south-side widening to a four-lane divided facility with a 30-foot median. A diamond interchange is provided at the NC 268 junction. The US 421 Bypass/US 421 Business/SR 1372 intersection is at-grade and employs both stop sign and signal control.

Accident rates (per 100 million vehicle miles) along the project between January 1984 and February 1987 are summarized below:

	<u>US 421</u>	<u>Statewide average for similar routes (1986)</u>
Total accident rate	188.2	191.9
Fatal accidents	3.1	4.0
Non-fatal accidents	76.8	91.7
Night accidents	53.8	56.7
Wet accidents	40.7	44.2

These figures indicate the accident rates along the project are lower than the Statewide rate for rural "US" routes. Twenty percent of these accidents involved vehicles running off the road; thirty-eight percent involved rear-end collisions. Out of 245 total accidents that occurred along the project during the three-year study period, twelve occurred at the NC 16 intersection, twenty-six occurred at the SR 1323 intersection, and sixteen occurred at the NC 268 interchange.

The alignment of the existing facility is generally good. The terrain in the project area is rolling. The entire project has a posted speed limit of 55 mph. Approximately 65 percent of the project has unrestricted passing sight distance greater than 1500 feet. Toward Maple Springs the project area is primarily rural in character with commercial and residential development intermixed. Development on either side of the road is about equal. Toward Wilkesboro more development has occurred and is primarily commercial. Just west of Wilkesboro heavy commercial development has occurred along the north side of US 421, but not to the south, most likely due to rugged terrain. Due to the amount of commercial activity just outside Wilkesboro, side road interference is greater there than toward Maple Springs. Further development near Wilkesboro is anticipated in the coming years.

Present traffic volumes (1987) range from 7800 vehicles per day (vpd) at the west project terminal to 16,600 vpd at the east terminal. Truck traffic comprises approximately eight percent of these volumes. Traffic volumes at these locations for the year 2007 are estimated at 14,800 vpd and 30,700 vpd, respectively. A capacity analysis of the project indicates that during peak traffic periods the existing highway is currently operating at level-of-service D near the west project terminal and at level-of-service E at the east terminal. It is anticipated the entire facility will operate at level-of-service E in twenty years, based upon the above traffic projections.

Project Terminals

West of the project US 421 is a four-lane divided facility with partial access control. East of the project is a 1.8-mile segment of the US 421 North Wilkesboro Bypass with full access control and a four-lane divided cross section.

Recommended Improvements

It is recommended an additional 24-foot pavement with 10-foot useable shoulders (2 feet paved) be constructed south of the existing highway from the west project terminal to SR 1146 (6.9 miles). A 30-foot grass median should be provided to separate the two pavements. From SR 1146 to SR 1322 (3.4 miles) it is recommended the existing highway be widened on the south side to a five-lane, 60-foot facility with a continuous left-turn lane. This cross section will be more compatible with the heavier commercial development near Wilkesboro. The existing highway has a four-lane divided cross section from SR 1322 to the Yadkin River (0.8 miles). From the river to east of NC 268 (0.7 miles) it is recommended an additional 24-foot pavement with 10-foot useable shoulders (2 feet paved) be constructed south of the existing highway. Resurfacing the existing highway is also recommended.

Approximately 30 feet of additional right of way will be required to widen US 421 on the south side to a multi-lane facility from Maple Springs to SR 1322. No control of access is recommended within this segment. No additional right of way will be required from SR 1322 to NC 268.

Project Costs

Construction	\$17,000,000
Right of way	<u>4,200,000</u>
Total project cost	\$21,200,000

Bridge Improvements

Four bridges are located along the project and are described below. None of these structures is scheduled for improvement in the 1987-1995 Transportation Improvement Program.

Bridge No.	Feature Intersected	Length (ft.)	Clear Roadway Width (ft.)	Estimated Remaining Life (yrs.)	Sufficiency Rating
49	Lewis Fork Creek	251	28	6	66.5
55	Lewis Fork Creek	276	28	7	77.1
67	Yadkin River	225	28	16	70.2
70	NC 268	196	28	26	73.8

It is recommended that each bridge be rehabilitated as part of the project. The cost of these bridge improvements (approximately \$600,000) is included in the cost figures shown above. The above figures also include the cost of constructing bridges parallel to the existing ones to accommodate the recommended four-lane divided cross section.

Need for Project

US 421 is the principal east-west route in northwestern North Carolina. This highway provides a connector between I-40 (at Winston-Salem), I-77 and the resort areas located within the Blue Ridge Mountains. Local officials and residents from the area are in favor of a multilane US 421 facility.

Several segments of US 421 in northwestern North Carolina are included in the NCDOT Transportation Improvement Program (TIP) for widening to a multilane facility. Completion of these projects would provide a multilane US 421 facility from Winston Salem to Boone, a distance of approximately 76 miles. From I-40 to the Yadkin River (approximately 13 miles) US 421 is presently a four-lane, freeway-type route. The 16-mile segment of US 421 from the Yadkin River to I-77 is included in the TIP for four-laning under Project R-2120. Construction is scheduled for Fiscal Year 1992. Widening US 421 to a four-lane facility from I-77 to east of Wilkesboro (18 miles) is included in the TIP for a feasibility study under Project R-2239. Under the subject R-2240 project US 421 would be widened to a multilane facility from Wilkesboro to Maple Springs (12 miles). The 6-mile segment of US 421 from Maple Springs to the Watauga County line is presently a four-lane divided facility with partial access control. The remaining 11-mile segment of US 421 to Boone is scheduled in the TIP to be four-laned beginning in Fiscal Year 1993 under Project R-529.

Anticipated Environmental Impacts

The Yadkin River and several smaller streams are crossed by the project. The extent of wetlands impacted by the recommended improvements at these crossings should be evaluated in the environmental document. Approximately 15 to 20 relocations will result from the acquisition of additional right of way south of the existing highway. However, within the more heavily developed eastern portion of the project the recommended south-side widening will avoid the heavier commercial activities north of US 421. Noise levels along the project will likely increase due to the recommended widening.

Alternatives

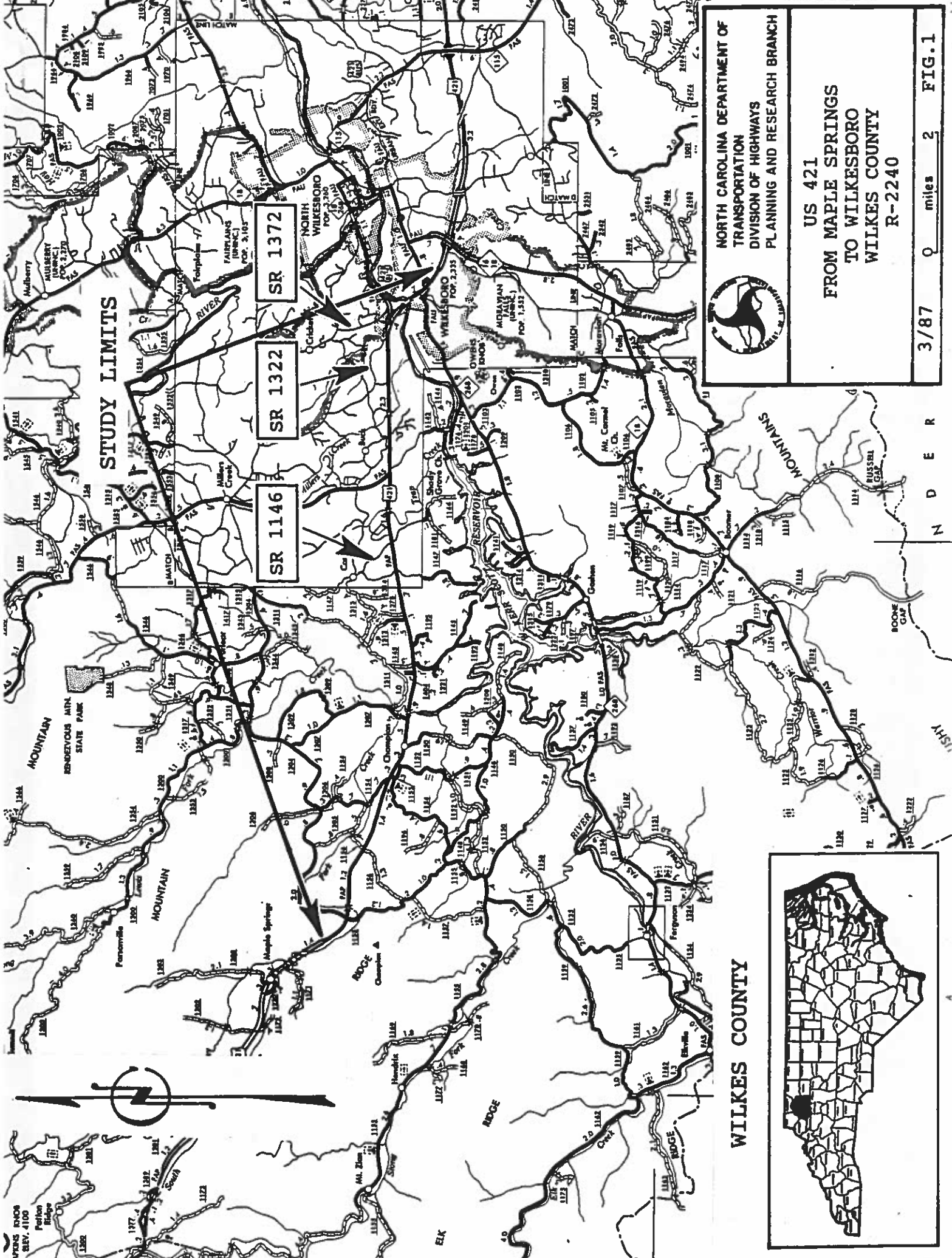
If the project is to be implemented at a future date, all feasible alternatives and their associated impacts will need to be evaluated in a planning/environmental document prior to that time, and a final decision made as to the most appropriate improvement. For example, transitioning to north-side widening to minimize relocations should be considered. In addition, the office of the Division Engineer requested that consideration be given to reconstructing US 421 on new location south of the existing road from east of NC 16 to west of the Yadkin River. This alternative would avoid both the congested US 421 Bypass/ US 421 Business/SR 1372 intersection and the heavily developed area along US 421 just west of Wilkesboro, thus favoring through traffic. However, it would also require more additional right of way and cost more than the recommended improvement. The recommended improvement within


this area (five-lane facility with continuous left-turn lane) will constitute the only urban-type segment of US 421 between Winston-Salem and Watauga County, based upon the anticipated improvements discussed above. Further consideration should be given to reconstructing US 421 on new location south of the existing road.

Basis of Study

Field investigation and correspondence with the Division Engineer served as the bases for the improvements recommended in this report. An aerial mosaic of the project, original construction plans for the US 421 North Wilkesboro Bypass, and project reports detailing the results of earlier studies to widen US 421 were used to develop these recommendations. The Right of Way Branch and Design Services Unit provided the cost estimates.

JWS/wp

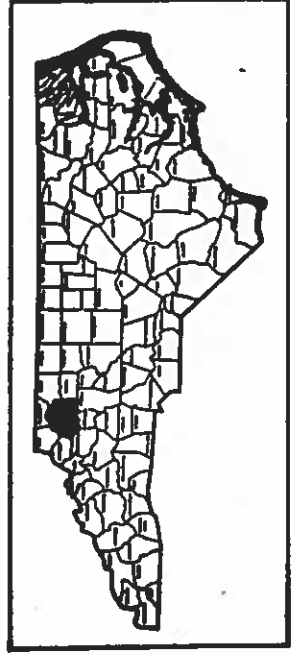




**NORTH CAROLINA DEPARTMENT OF
TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND RESEARCH BRANCH**

**US 421
FROM MAPLE SPRINGS
TO WILKESBORO
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3/87 0 miles 2 FIG.1



WILKES COUNTY

